C Q — T V

THE QUARTERLY JOURNAL OF THE BRITISH AMATEUR TELEVISION CLUB

No. 105

JANUARY 1979

The British Amateur Television Club.

C Q - T V is the quarterly journal of B.A.T.C.
Contributions for publication should be sent to
the Editor, Andrew M. Hughes
17 Woodside Avenue
Esher, Surrey.
KT10 8JQ.
Close for press dates are Nov. 1st. for the Jan. issue; Feb. 1st. for the April issue, May 1st. for the July issue, and August 1st. for the Oct. issue.

CONTENTS

Letters to the Editor page 1
Innovations in sstv page 1
Feedback page 2
Project 100 page 4
Contest News page 6
TV on the Air page 7
A Quick TV Transceiver page 8
A Microwave Vision IF page 16
Photo etching of pcbs page 18
Convention 78 in pictures page 19
Adverts page 20

WHO TO WRITE TO

Subscriptions and changes of address should be sent to the Treasurer.

Membership enquiries should be sent to the Membership Secretary.

Advertisements and articles for C Q - T V should be sent to the Editor.

Orders for books and magazines should be sent to B.A.T.C. Publications; orders for equipment and components to Club Sales. Please address your letters to the most suitable Club Official, and only write to the Secretary if you REALLY do not know who you want; forwarding letters is a boring chore! Also, please enclose a stamped addressed envelope with your letters, with an extra stamp if you expect it to have to be forwarded.

COMMITTEE MEMBERS NAMES AND ADDRESSES

PRESIDENT

R.C. Hills G3HRH

CHAIRMAN

Don Reid
6 Mount Crescent
Brentwood, Essex.
CM14 5DB
Tel. Brentwood 223735

GENERAL SECRETARY

Mike Cox G8HUA
13 Dane Close
Broughton, Brigg
South Humberside.

MEMBERSHIP SECRETARY

Brian Summers G8GQS
13 Church Street
Gainsborogh
Lincolnshire.
Tel. Gainsborough 3940

TREASURER

Alan Pratt
10 Grammar School Road,
Brigg
South Humberside.
Tel. Brigg 53014

B.A.T.C. PUBLICATIONS

Malcolm Sparrow G3KQJ
64 Showell Lane
Penn, Wolverhampton
West Midlands.
Tel. Wombourne 3037

SALES AND LIBRARY

C. Grant Dixon G8CGK
Kyrles Cross
Peterstow
Ross-on-Wye
Herefordshire
HR9 6LD
Tel. Ross-on-Wye 2715

EQUIPMENT REGISTRY

Alan Watson
Somerby View
Bigby, Barnetby
Lincolnshire
DN38 6EU
Tel. Searby 347

CONTESTS AND ACTIVITY

Graham Shirville G3VZV
18 Church End
Milton Bryan
Milton Keynes
Bucks. MK17 9HR

COMMITTEE MEMBERS

Jeffrey Borin
Trevor Brown G8CJS
Cyril Chivers
Mike Crampton G8DLX
Lewis Elmer G8EUP
Dave Lawton G8ANO
John Lawrence GW3JGA
Paul Marshall
Tom Mitchell G3LMX
Joe Rose G8CTG

BATC Library.

The Library has acquired the copies of "IBA Technical Review" listed below, and these are available on loan to members. Postage is 18½p each way, so please enclose a stamp of this value with your request, which should go to the Librarian, Grant Dixon, at "Kyrles Cross", Peterstow, Ross-on-Wye, Herefordshire, HR9 6LD.

No. 2 Technical Reference Book
No 7 Service Planning and Propagation.
No 8 Digital Video Processing.
No 9 Digital Television Developments.
No 10 A Broadcasting Engineers Vade Mecum.
No *11 Satellites for Broadcasting.

*If any member has any other in this series (they are out of print) and would be prepared to donate them to the Club they would be most welcome.

Letters to the Editor.

Dear Sir,

In October 1976, B.A.T.C. released "Amateur Television", a book which has sold very well, approximately 1200 copies having been sold in the first two years.

It is now the desire of the Club's committee to publish a further handbook with completely new material, and in order to set our plans into motion, I have been asked to contact possible authors and co-ordinate the writing of the book.

Therefore I am writing to ask for volunteers who could contribute a chapter, or part-chapter. It is hoped to use new material throughout, and therefore we ask for original circuits. The Club would like to offer PCBs for the projects, so if designs are available, they would be appreciated.

Could you please write to me as soon as possible if you are able to help the Club by writing for this book, mentioning which chapters or subjects you woud best be able to tackle.

M. T. Crampton
16 Percival Road
Rugby
Warwickshire

Dear Sir,

I have read Tom Telfer's letter in CQ-TV No 104 and I am sure he will be pleased to hear that I have designed a set of three boards for a sophisticated SSTV monitor using a digital decoding technique. The boards use 741 op-amps and standard TTL ICs, and plug into 0.2" spaced edge connectors. The design also incorporates a waveform display on the monitor screen. These boards are being produced now and I cannot quote prices but if any one is interested I shall be pleased to receive enquiries.

C. G. Dixon G8CGK
"Kyrles Cross"
Peterstow
Ross-on-Wye
Herfordshire
HR9 6LD

Innovations in SSTV

By J. Brown G3LPB

Some of these warrant little introduction. After all, many if not all had their first look at slow to fast conversion at the Aston University show organsied by B.A.T.C. about October 1975 time when Volker DL2RZ came across with his home-built gear. This seems to be the "In thing" these days with the appearance of the Robot 400 (the 300 being considered "old hat"). They now have introduced the 501 and the 601, these are 256 line convertors I think (no data to hand at time of writing).

Recent communications in a letter from DL2RZ included leaflets of the new gear there. This includes the SC420, the SC421, the KB420 and the LC420. These are two convertors, a keyboard, and a "light pen".

The convertors only need power and a source of fast scan input and the output can be fed to either a fast scan monitor or to the so-called old 5FP7 type monitor. They both allow many other features, the 421 being the latest. As yet I have been unable to get the technical German translated but it has a lot of added features new to SSTV.

The KB420 is a keyboard with characters being selected in numbers on the screen, built in cursor, black or white, repeat spacer key, and allows any picture held in the memory of the scan convertor to be used as a background to the added keyboard. (As photo taken from the DL2RZ screen).

The LC420 is the "electric pen" and allows writing to be done on the top of any background photos or captions.

DL2RZ also offers pc boards for many things including monitors. I should point out here and now, I have no buisness contact with Volker in any way, Neither have I any literature or circuit data. I am just a "lone hand" that feels things should be mentioned without any advertising. It's just a ham project, I suppose.

Having seen a Robot 400 in action, yes I must admit it fascinating and a bit of electronic wizadry, but I personally do not think it is slow scan as we use the term. Maybe we can adopt a new term for this "memory type" presentation? SSTV so far has had a few changes i.e. 120/128 lines, then 256 lines at their own respective frame speeds. There must be other secrets shared by the few that may benefit the many who would like their little "start".

The WB9LVI has been built by many, but no extra data is fed to others, so maybe it will come. I for one, could never afford the convertor and as yet no one has offered pc boards for others to maybe build over a long period. Anyone any other thoughts?

Feedback

by Tom Mitchell G3LMX

Feedback needs to occur in both directions if this column is to survive, so this time there will be appeals for information as well as passing various oddments to you.

Two snippets which came my way on which I would like more details: I understand that there is now a 'DIN' standard for wiring inputs and video outputs from small vidicon cameras for use with Home entertainment type video cassette recorders, can anyone provide details?

I have also heard that recent ITT colour receivers have Varicap tuners which will go down to 70 cms without modification. All that has to be done is to short out a resistor at the bottom end of the Varicap potentiometer circuit which limits the lower limit of the tuning range; can anyone provide information on the models/chassis numbers involved, and details of the tuner used?

The above item is one way around the problem of receiving colour on 70 cms where domestic pressures (or the fact that the set is rented) prevent access or modification to the only colour set in the house.

There is however an alternative approach which is that of building an up-convertor with an output in Band 4 or 5.

Someone reading this must have such an item - details please! I would knock it into shape for publication. I would like to produce such an item using printed circuit inductors as the next Club Project, but I lack the time to produce it from scratch.

Just in case you think I have been neglecting slow scan, I had intended to appeal for designs for a basic SSTV monitor which could be turned into a Club Project - I even had someone lined up to do the pcb artwork if required! However, as some of you may know, Grant Dixon has written a book on SSTV which should be published this year, and he has been working on boards to go with it. The first set of three boards for a rather fine monitor are being assembled for a final test - I hope to have a set soon. This is not a Club Project but will, of course, be available to members. Grant has still to write the paperwork and do a final pricing, so if you write to him before he advertises please send a s.a.e. and don't expect an answer for a while; he will have to finish his final testing, and having to reply to letters will only hold him back.

Still on the subject of SSTV - we can only publish what we receive. Articles to Andy Hughes, and hints and ideas to me please. Has anyone designed a modern scan convertor using static memories? I think this one should be Project 1000. I will probably be able to get help for the artwork for this if the design is sound.

We could also use a circuit for a simple vidicon camera; the ideal unit should be capable of being driven by an SPG or have an internal divider to produce interlaced pictures, and should run from a single +12 volt rail.

USE OF THE P100 COLOUR LOCK SYSTEM WITH EXISTING SPGs.

Iam reproducing parts of a letter, and a diagram, sent to me by John Goode of St Albans.

"Dear Tom,

Although I am NOT building the P100 SPG, I am very interested in upgrading my present SPG to colour operation. I was contemplating using an unlocked 4.43 MHz oscillator as the sub-carrier source, but the publication in CQ-TV No 103 of Eric Putt's ingenious Subcarrier to line lock system has made me change my mind. My present SPG uses a 1 MHz master oscillator and so a 4.43 to 1 MHz (complete with 25 Hz offset) circuit built on an external board is what I require.

I think I have grasped the idea of " offset sampling", if I may call it that, and I enclose a circuit which I have extracted from the P100 series of articles that I think should work - and I would appreciate your comments."

Eric and I have been through the diagram and agree that it should work. As usual, Eric has come up with a few small improvements:-

a) the test switch should be applied to both reset and clear for reasons described elsewhere in this issue (it minimises the shift of the 5 MHz oscillator between locked and unlocked conditions).

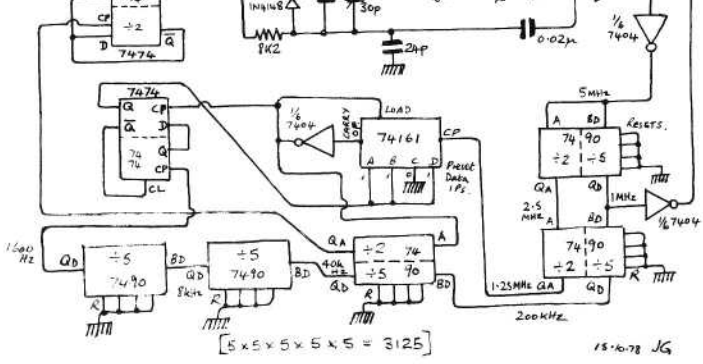
b) the 1 MHz output is not a square-wave; its mark/space ratio can be improved from 4 : 1 to 2 : 3 by taking the output from Qc rather than Qd.

I would also like to suggest some sort of transistor buffer between the subcarrier distribution and the input of the 'D' type so that the unit will operate from a standard 1 volt terminated subcarrier feed.

In looking at the diagram it is important to realise that it is drawn to show the minimum package count. Where one package is used for two functions, the different parts are separated by a dotted line.

This basic design is capable of considerable extension, for example the addition of an extra ÷ 32 to the existing 1 MHz output would give 2lf for use with commercial SPGs, or the original B.A.T.C. SPG designed by Arthur Critchley.

Since there are two unused ÷ 2 sections available in the 7490s, one of these plus a 7493 would provide a 2lf square wave. Other clock frequencies such as 2.5 or 1.25 MHz are also possible.



PROJECT 100

PART 6

by Eric Putt and Tom Mitchell G3LMX

A PAL COLOUR PATTERN GENERATOR and SYNC PULSE GENERATOR

PROJECT 100 UPDATE

For a number of reasons including a temporary change of work location, C Q - T V's closing date has come and gone before I could finalise development, let alone produce pcbs for the final stage of the Project.

Thanks are therefore due to Andy for, holding back on his going to press date to allow me to update the information available to those engaged in building the project. Including prototypes over 90 boards have been sold and so far out of the comments I have received, only one person has needed assistance in locating a fault. This and one other report was due to a faulty IC in the SPG Genlock, hence the advice in the data sheet (Note 1) to test the SPG without Genlock first.

525 LINE VERSION

Those members who live in 525 line 60 field areas may like to know that Eric has designed and tested 525 line versions of both the SPG and Pattern Board, and that working drawings and data are being prepared.

THE SPG FOR NTSC AND PAL SYSTEM M

The 525 line version of the SPG has been updated from that originally planned when the board was designed and now comes very close indeed to the new (EIA Television Systems Bulletin No. 4) specification for NTSC.

The addition of a single pole switch to enable Bruch Blanking and a feed of the appropriate subcarrier frequency into the locking input, gives instant change over between full subcarrier lock on NTSC and PAL System M. (Note that due to the number of lines in a 525 picture PAL M does not require an offset, if only we in Europe used a 627 line system!)

N.B. The 525 line SPG requires a 5035 KHz crystal Parallel resonant at 30 pf.

525 LINE PATTERN BOARD

This has also been built and tested and when fitted with a 14.30244755 MHz crystal will produce PAL M. However, the colour section is unsuitable for NTSC but as a monochrome source the board will still produce black, white, grey scale chequerboard, and Grille with castellations.

Should anyone want details or boards for 525 will they please write to myself (Tom Mitchell) as the boards require a few small modifications.

SAVING POWER

Using standard TTL the SPG takes around 350mA and the pattern generator about 250-300mA. A pattern generator board has been made up using 74LS series devices, reducing the demand to under 100mA. The SPG board however, presents a problem since as far as we are aware, no one makes a 74LS70. Using a standard 7470 with a board equiped with LS devices would exceed the fan out limits of the LS devices; it might well work, but it has not been tried!

Better solutions have turned up to problems already noted in previous articles.

a) SPG 5 MHz oscillator

There is a tendency for some 5 MHz crystals to go into an overtone mode of oscillation if the series capacitance is too low, hence the need for some small value of AOT capacitor across the trimmer. However, if excessive amounts are used the correction range is limited. In the past I have recommended increasing the 24pf capacitor between the feedback line and earth in stubborn cases.

A better cure is to fit a resistor of about 270-330R in series with the .02uf in the feedback path.

b) CPG Oscillator buffer stage IC22

Reference was made in the last part to the strange voltage dependent instability in this stage. The capacitor wired between the first two stages of IC22 (and located on the board just above it) should be reduced to around 200pf.

AVAILABILITY OF CRYSTALS

Since the last issue went to press we have managed to purchase a stock of miniature wire-ended 5 MHz crystals (HC 18U) for the SPG. At present both the 4fsc and 5 MHz crystals are available from stock at £2.60 each. However, existing stocks of the 4fsc units are running down, more will be ordered but as a smaller quantity is involved a price rise appears inevitable.

IMPROVED CASTELLATIONS ON CPG

Those of you who have examined the Grille on a monitor rather than an average TV may have noticed a point that Eric and myself have only recently discovered. Due to an oversight when the line clock into the final version was changed from 'b' to 'a', the castellations on the left hand side of the picture are wider than those on the right hand side.

This can be improved by (the right hand side is still greater than that on the left by the width of one grille line) the following simple modifications.

1. Locate IC3 and cut track between pins 1 and 13. Now wire from pin 1 of IC3 to a) Pin 10 of IC3, b) Pins 7 and 10 of IC9.
   This moves LB from reset to clear of IC3 and also applies it to the J and K inputs of IC9 (which is next to IC3 on the board.)
2. The final stage of the modification is to invert the 'a' input
   i) If you are using the board with the P100 SPG, insert an IC in position 23 (This can be either a 7413 as specified or a 7420 which takes less current.)
   ii) Remove the short link from edge connector to IC3 pin 11.
   iii) Fit alternative link from IC6 pin 11 to IC23 pin 6 shown on wiring diagram.
   iv) Fit a new link from input from edge connector to pins 1 and 2 of IC6: there are several suitable holes in the board.

USING THE SPG AS A MONOCHROME GENLOCK SPG

As designed the 5 MHz oscillator in the SPG expects to lock either to a subcarrier input or to incoming video and the diode which is connected between Q and Q of IC19 acts as a switch either shorting out the trimmer or placing a small amount of extra capacity across it. Use is also made of the fact that operating both preset and clear of a 7474 makes both Q and Q outputs high.

If there is no reference subcarrier the correction circuit will go to one end of its range, so if the oscillator is set to exactly 5 MHz before attempting genlock the circuit will only correct in one direction.

The simplest answer is to adjust the trimmer while genlocked to a stable source of known accuracy and then check that the circuit will correct in both directions by earthing pins 13 and 10 in turn for a few seconds at a time.

If this is done the 5 MHz oscillator will be a few hundred cycles off nominal frequency when locked.

This should be good enough for most purposes but an alternative would be to remove IC24 (or cut

CONTEST NEWS

The first news item is that B.A.T.C. has a new Contest Organiser. He is Graham Shirville G3VZV who readers may remember was elected to the Committee at the 1978 Convention. Graham has been a member of B.A.T.C. for some time now, and brings much experience of atv operation to the post. Contests should be lively affairs this year!

1978 INTERNATIONAL ATV CONTEST

U.K. ONLY RESULTS (70 cm)

Position	Call	Points	QRA	QSO's	Best Dx
1	G8DTQ	2249	ZL60E	17	F1BJB/225Km
2	G8GLQ/A	1707	YL49G	12	G8IWX/188Km
3	GW800J/P	1215	YL25J	13	G8IWX/233Km
4	G4CRJ	1176	ZL38B	10	F1BJB/265Km
5	G8GKQ	305	AL41F	10	G4CRJ/36Km
6	G8CTT	172	AL41J	7	G4CRJ/45Km
7	G4AKG	116	ZL50E	4	G4CRJ/34Km

The Combined International Results will be published as soon as they are available.

No logs were received for any other bands! Where were the Midlands and East Anglian stations? We apologise however for the clash of dates with the Convention in London, and for the confusion over the rules.

It is proposed to arrange a U.K. only contest in the early summer of this year - with a big star prize. Watch C Q - T V, Radcom, S.W.M. and Wireless World for details. Presumably the International Contest will be repeated this year, details will be printed as soon as possible.

HAVE YOU PAID YOUR SUBSCRIPTION YET ? IT WAS DUE ON JANUARY 1st.

Hurry up and send it to the Treasurer - or this MAY BE YOUR LAST CQ - TV.

(Last year seven non-payers were SHOT)

ERRATA for CQ - TV 104

page 13: "... ... to drive 1 amp via buffers ... ..." should read "... ... to drive lamps via buffers ..."

Project 100 continued from previous page;

tracks from Pins 8 and 9). Joining both tracks from IC24 Pins 8 and 9 to the output from IC23 Pin 6 would force Pins 9 and 8 of IC19 high removing bias from the switching diode until the reference detector is enabled.

TV on the AIR

By John L. Wood G3YQC

Have you noticed during the past year or so how much information and general interest there has been on amateur television in the centimeter wavebands? Of particular note are the articles by GW6JGA/T (CQ-TV 100) and G8EIM (CQ-TV 103). Both articles give practical details of 3cms systems. At present there are several amateurs who are experimenting with such equipment, and I feel that in the next year or two we will hear a lot more about it.

The use of 3cms of course, means that for most of us, portable operation is essential (except for those who live atop mountains) since the path required will invariably be line of sight. This is not necessarily so for CW or voice communications, but for TV, where signal strengths need to be good, attenuation caused by obstacles or earth curvature will almost certainly be too severe. However, I hope someone can prove me wrong.

I am at present engaged in construction of a complete 3cms system. At the time of writing (Nov. '77) the FM IF unit, tunable gun oscillator nad microwave mixer are completed, and the transmitting gun oscillator is well on the way. I will be using a couple of 18 inch dishes which yield a theoretical gain of 32dB, (assuming an illumination factor of 0.7). At present the system is for sound and CW use, but when it is all set up and working satisfactorily, I intend converting it to fast scan vision.

It will certainly be nice to transmit full tv with sound, since there is so much space available on 3cms. it should present no problems. The thought occurs to me that we have no standards as yet. Perhaps we should aim first for a common frequency of operation. This would simplify waveguide construction, since tunable oscillators would be unnecessary. Also, what about the signal bandwidth and sound/vision separation? I should think professional standards could be adopted. Has anyone any gen or suggestions to offer?

ACTIVITY NEWS

G8GUN, near Birmingham has been busy re-oragnising his shack recently, but is now back on the air with a full TV station which we presume now runs with superb efficiency.

G8BOP from the same area joins the ranks and is at the present time receiving vision only, but hopes to be transmitting the stuff soon. No details of the equipment are available as the info came off the grapevine. Maybe I will have the gen for next time.

Our old stalwart G5KS continues progress with his very nice colour set-up. This time it is the addition of a transistorised linear for 70cms which should give around 100 watts! (Oh for a deep pocket).

CLUBS AND EXHIBITIONS

The Midlands Amateur TV group were treated to a lecture on Teletext on Nov. 6th which went down very well with all present. Of particular interest of course was the amateur radio page transmitted by the I.B.A.

The B.A.T.C. were well represented at the Leicester show. The stand was very well done and I suspect much credit must go to Mike Crampton G8DLX who always works so hard for these events. I went on the Friday, and whenever I got to the stand it was always crowded, whcih must be a good sign. I also heard one or two conversations around the hall about amateur tv which shows the interest there is still waiting to be tapped. The event was a great success for the B.A.T.C. and our thanks must go to all those who were involved in preparing and running the stand.

TV ON THE AIR .....54 Elkington Road, Yelvertoft, Northampton, NN6 7LU Tel. (0788) 823 250

A QUICK TV TRANSCEIVER.

Reprinted from "Radio REF" with permission of the Editor, with additions and alterations by T. Brown G8CJS

By J.C. Ducasse F1QM

Wishing to be quickly active with a fixed or portable tv station sending sound and vision on a single carrier on 438.5 MHz without the use of a sub-carrier, we have built the unit described below in a matter of 6 hours working time.

The unit is built to work with a phase modulated transceiver, the ICOM IC30A which will give 10W of RF. The procedure is simply to amplitude modulate the last two stages of the IC30 with video, whilst the carrier remains phase modulated as for normal operation. Fig. 1.

The block diagram shows the various functions of the sound and vision transceiver assembly. If you have sufficient field strength you can do without the preamplifier; also it is possible to use two separate antennas, one for the IC30 and one for the TV set. Fig. 2.

To modulate the 2 amps at 12v necessary for the PA we have used a modified F3YX modulator (see "Radio REF" 12/74). We have built the modulator in a box of size similar to the IC30 so that it can sit on top of the transceiver. For power supply and regulation purposes certain components have been changed.

The construction of the modulator does not bring any particular problem; the BD135 are mounted on a heat sink raised up from the PCB so that enough space is left for the 20 1ohm resistor, this heat sink is insulated from ground as the collector of the BD135 is, with some manufacturers, connected to case.

The circuit of the second BC107 in the video section is useless for transmission if the French standards are used, the 100uF capacitor, the 150K and 180R resistors and the BC107 can be omitted.

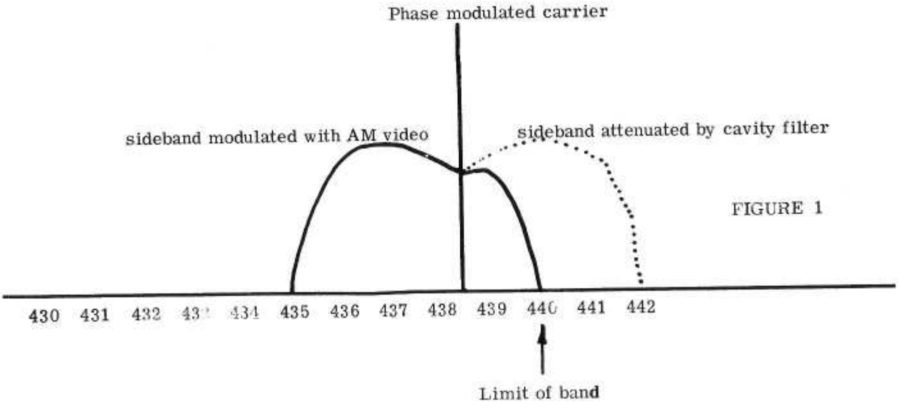


FIGURE 1

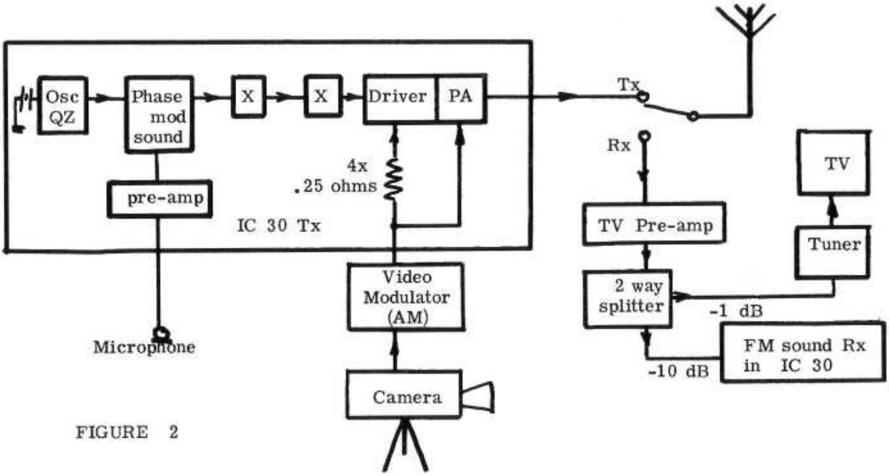
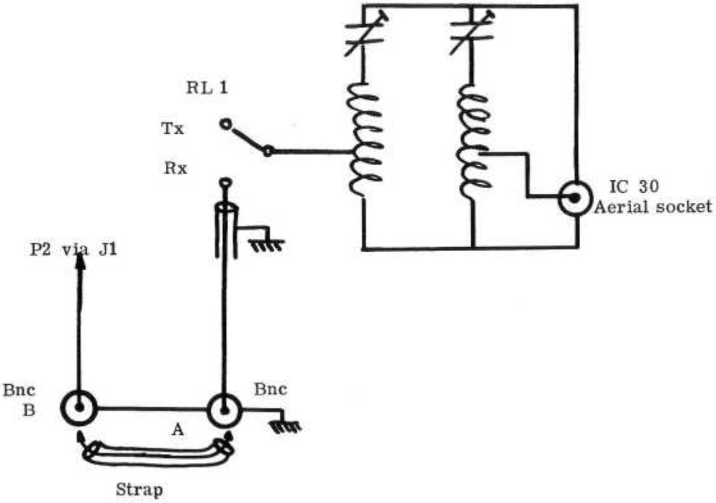

Osc
QZ
Phase
mod
sound
X
X
Driver
PA
pre-amp
4x
.25 ohms
IC 30 Tx
Microphone
Video
Modulator
(AM)
Camera
Tx
Rx
TV Pre-amp
2 way
splitter
-1 dB
-10 dB
FM sound Rx
in IC 30
Tuner
TV

FIGURE 2


RL 1
Tx
Rx
IC 30
Aerial socket
P2 via J1
Bnc
B
Bnc
A
Strap

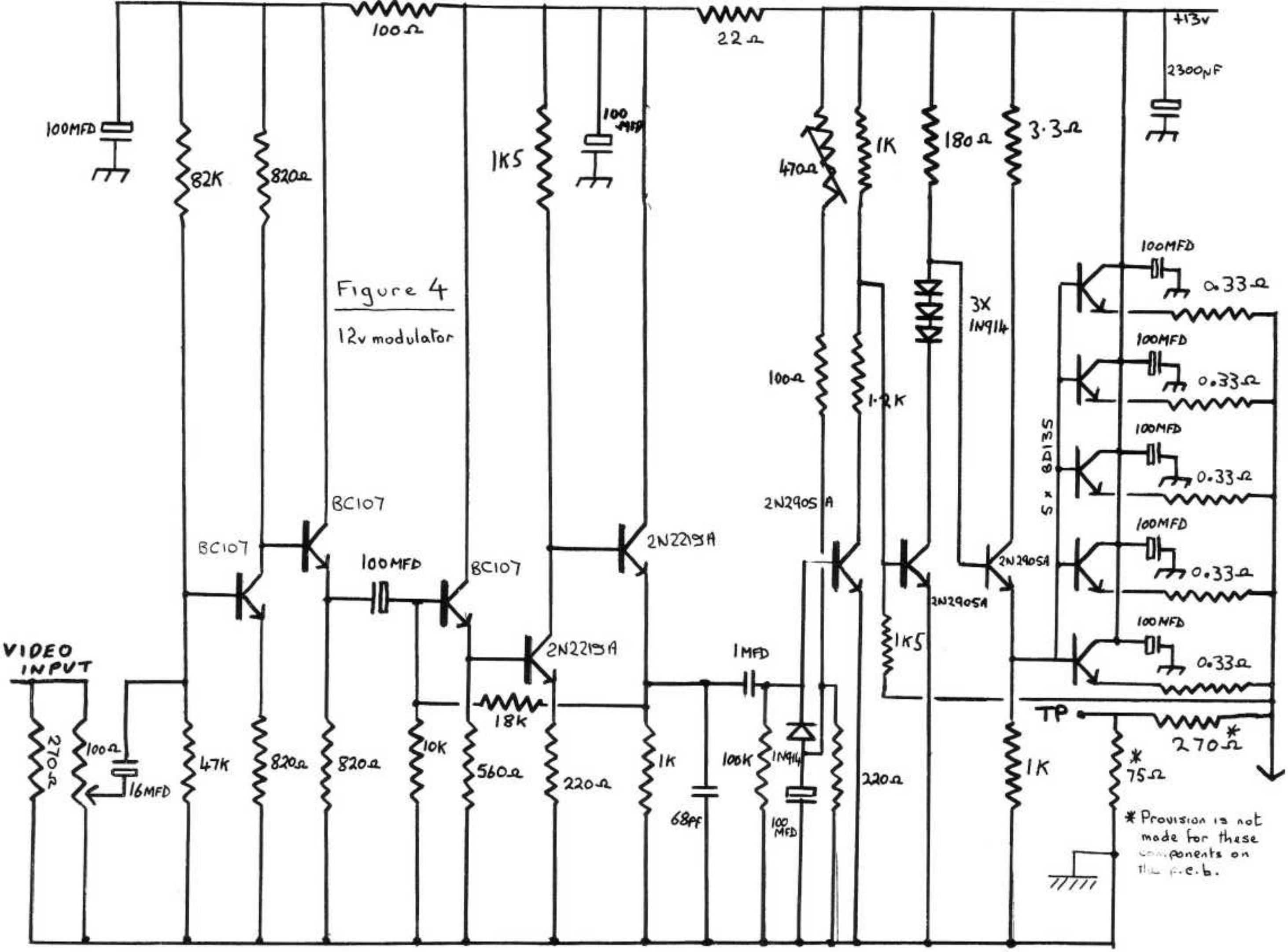


Figure 4

12v modulator

* Provision is not made for these components on the p.c.b.

MODIFICATIONS TO THE IC30A

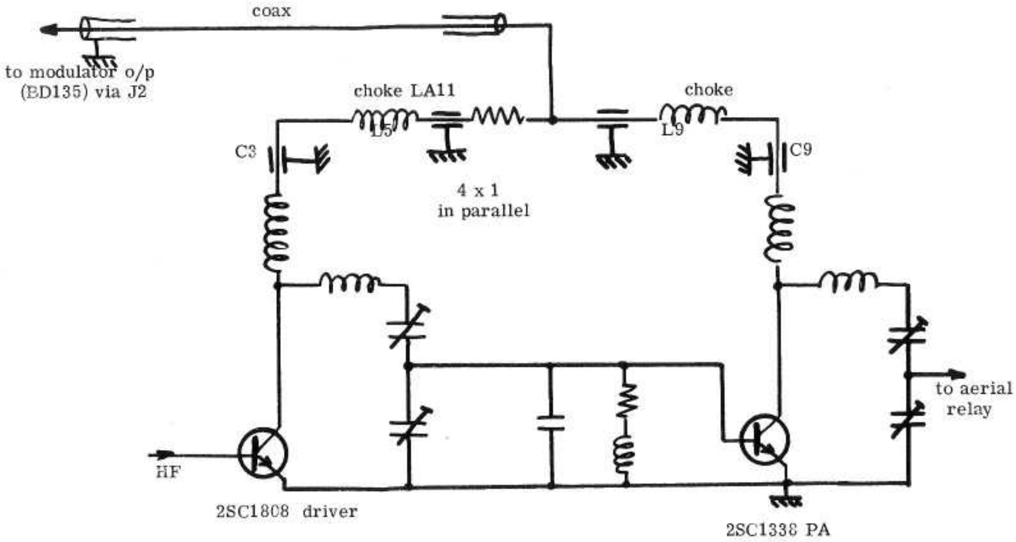
Insert a crystal for 438.5MHz in a spare socket for Tx and a similar one for Rx, adjusting to correct frequency with the appropriate trimmers. Open the screened box containing the 25C1808 driver and the 25C1338 P.A. Remove the two 10uF electrolytics C4 and C11 and also the two ceramic capacitors C3 and C9. (these capacitors would decouple the video to ground). Close the box - the internal modifications are complete! Unsolder and discard the red and orange wire which connects the +12v supply to the driver and final - 7 and 6 of P3. On the switch S1 (Hi-off-low) unsolder the ground connection, detach the green wire coming from 5 of P2 and solder it to ground. This transforms the "low" position into a "TV and Sound" position. The "high" position puts the IC30 into its normal FM 10W state. Solder a wire (heavy guage) from 6 of P1 to 5 of J2. On the case of the final, solder on to the bypass, after choke LA11, the core of a piece of coax RG58; join LA11 to LA12 (at the places where the +12v supply has been disconnected) by 4 resistors of 1 ohm $\frac{1}{4}$W in parallel with a sheath of flexible sleeving. Connect the core of the coax to 7 of J2 and ground the coax outer. Solder a wire on 5 and one on 7 and connect them to switch S1 (hi-off-low) so as to short circuit the modulator and deliver +12v non-modulated to the final.

MODIFICATION SCHEME

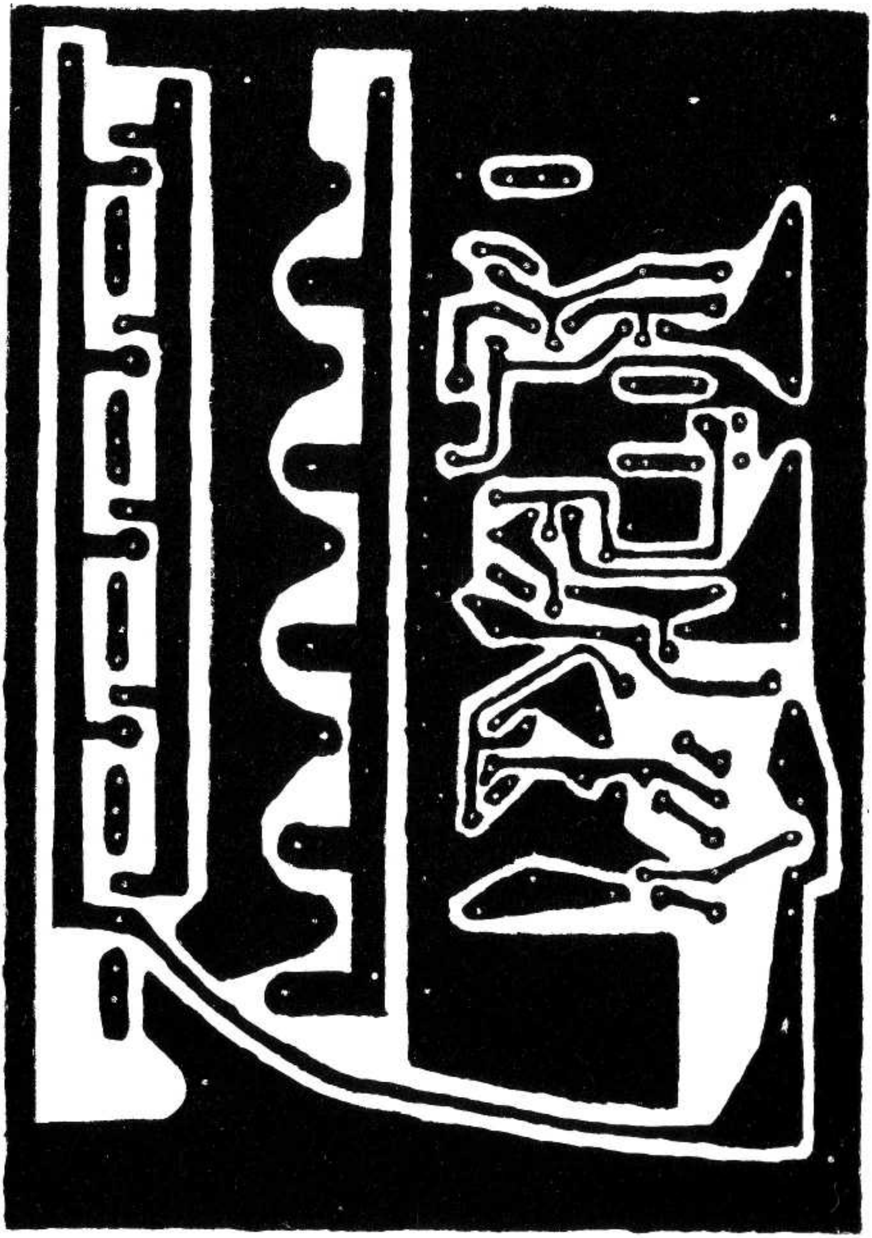
To take advantage of the internal antenna relay one mounts two Bnc sockets on the side of the transceiver (near J2). One could also use spare pins of J2 instead of the Bnc sockets, the losses being negligible. Unsolder the coax going from the relay to P2 on J1 (Rx antenna input of the IC30), resolder the end to the pin of Bnc "B". Solder another piece of the coax from RL1 to Bnc "A". For normal traffic, sound or vision without TV reception join the two Bnc sockets with a link.

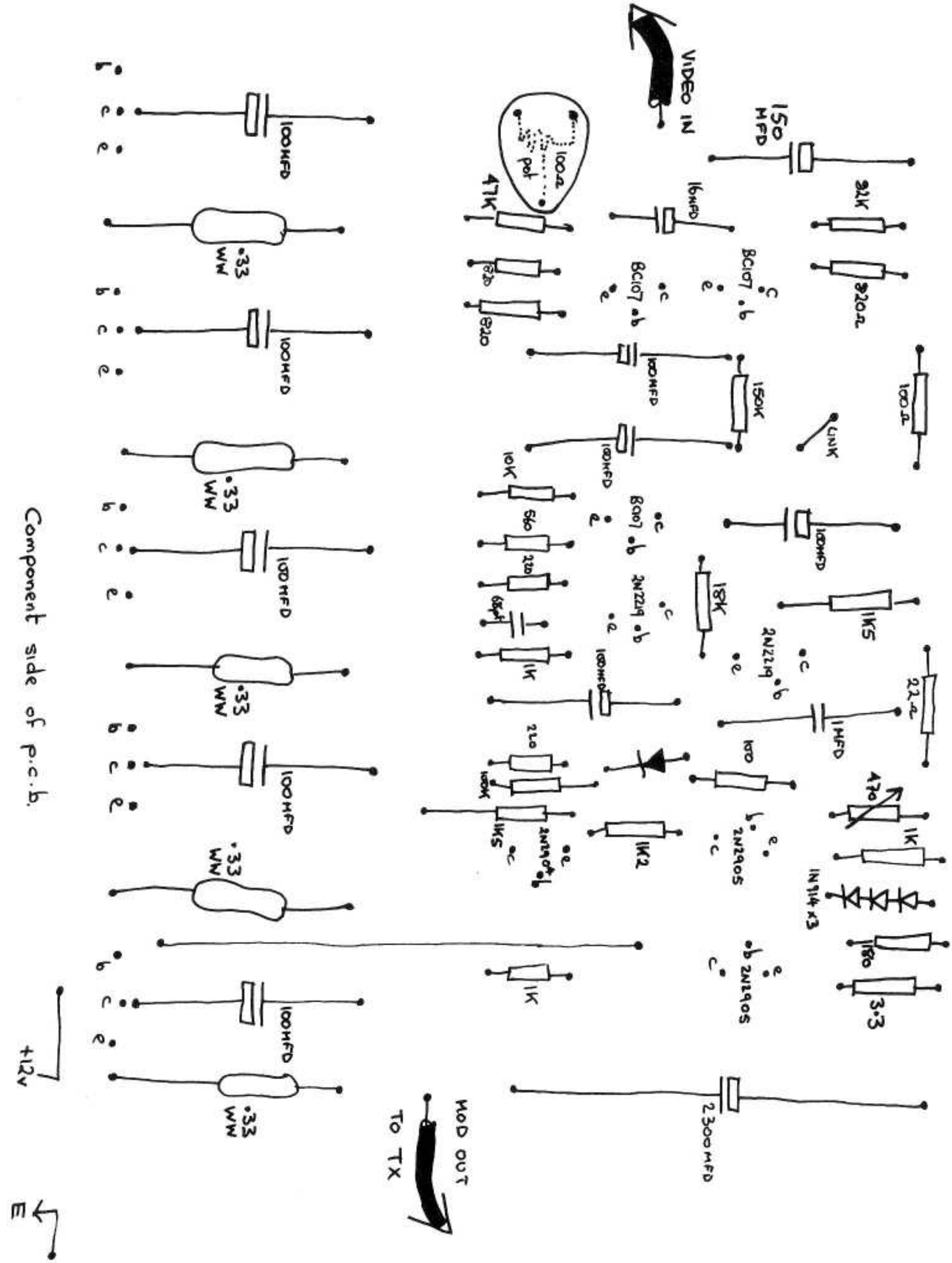
ADJUSTMENTS

On the modulator adjust the black level watching the TV receiver screen, or for preference use a monitor with a probe. Set the 470 ohm pot. to a position which gives 0.5W RF without any video. If this ad-

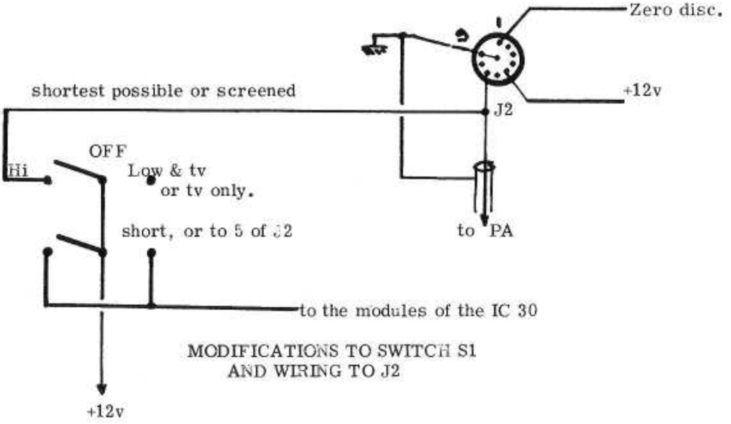


MODIFICATIONS TO FINAL STAGE





Component side of p.c.b.



MODIFICATIONS TO SWITCH S1
AND WIRING TO J2

justment is impossible alter the feedback resistor at the base of the 2M2905 between values of 1.5 and 3.5K. Then adjust the video gain to obtain the maximum RF without saturation. Point the camera to a white surface and readjust the trimmers of the driver and final stages to give maximum RF. Finally retrim the modulator controls. You will obtain, for a well adjusted transmitter, 4W max. reading on an RF wattmeter. The meter on the IC30 will give you a measure of the relative RF output. The IC30 will give 10W out in the FM mode, but don't forget that the "Bird" wattmeter measures a mean value and you can multiply this by 4 to get an idea of the actual peak value of your station.

For fixed station use, you will need a power supply of 13.8v at 3 amps d.c. For mobile operation it is best to use a well stabilised supply of 11.8 volts to avoid a change of black level when the supply voltage varies with the running of the motor.

It is evident that this modulator can be used with other PA stages according to the experimenter's wishes.

A converter is being developed which will bring the IC30 directly out on TV channel 4.

F1QM will reply to questions if postage is paid (International coupon). Please send addressed envelope.

FDK MULTI U11 MODS.

By Trevor Brown G8CJS

To connect the modulator up to the Multi U11 requires the location of a red wire which connects the PA unit up to a large 10w resistor mounted on the underside of the unit at the rear.

Disconnect this wire and route it up to the B9A socket on the rear to any pin and then connect another wire from a different pin, back to the 10W resistor. Make up a blanking plug (i.e. a B9A plug with a link in it) shorting out these two pins so that putting this plug in the rear socket will return the circuit of the Multi U11 to normal.

Unfortunately there are no spare pins on the B9A accessory socket so you will have to disconnect two of the wires to make way for the extra wiring, or mount a new socket.

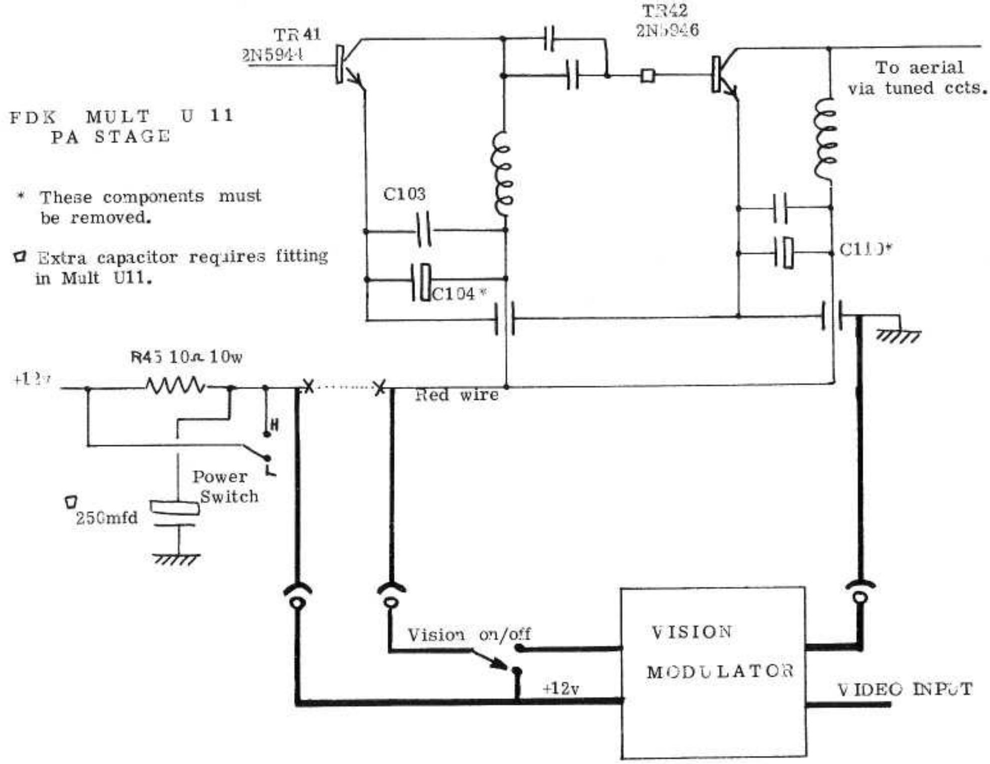
Next C104 and C110 require removing. These two electrolytic capacitors are in the screened PA section at the rear, and can soon be located with the help of the owners manual. To compensate for this missing decoupling I fitted an extra 250MFD from the 10W resistor down to earth.

All you require now is an extra B9A plug to connect your rig to the modulator. No link is required, just three wires. Chassis which is already available on the socket and the two new wires carrying modulation to the rig and +12v supply to the modulator unit as per diagram.

The modulator is very easy to set up. Connect the Tx to your aerial and plug the vision modulator in, Switch the vision on/off switch to the "vision on" position and operate the "push to talk" switch. Adjust the bias pot in the modulator so that 8 volts is present at the "mod out" point with no video present. Apply video to the input of the modulator and set the video gain pot for about two thirds of maximum.

Next, observe the demodulated video by switching on and in your vision Rx gear to your own output, and, finally, adjust both controls for the best result.

By operating the vision on-off switch you can return your rig to normal for FM QSOs or sound idents as per licence regulations. If you wish to disconnect your modulator from the rig you must install the blanking plug for the rig to behave as normal.



BIBLIOGRAPHY

"Radio REF"	TVtx by F3YX	12/1974	10/1976
	"73 Magazine"	12/1975.	

A MICROWAVE VISION I. F.

By
John L. Wood
G3YQC

There is undoubtably a growing interest in amateur television on the microwave bands. Peter Johnson G8EIM, gave details of a practical system in C Q - T V 103, which would provide a good basis for starting on these bands. However, although it seems fairly obvious that at present, frequency modulation is the most practical mode of transmission, there seems to be very little information available on suitable FM receivers for this mode.

The circuit given here was first used by Steve Birkhill to receive FM TV signals from ATS-6 satellite experiments for the Indian sub-continent. Many enthusiasts have built this design, and results proved excellent. The design is also published in a book entitled "Long Distance Television" by Roger W. Bunney.

The circuit itself is largely self-explanatory. It uses a NE561B phase Lock Loop IC as the demodulator, preceeded by a two stage amplifier with variable gain. The demodulated output is fed to a video amplifier and switched inverter stage providing a choice of negative or positive video, then through a variable gain amplifier whose output goes to a standard tv monitor. The trimmer capacitor should be set to about 15pF for the correct loop free run frequency.

Fig. 2 shows the block diagram of a simple microwave tv receive system. In it a fixed frequency gun oscillator is used, and a domestic VHF varicap tuner is used as a tunable IF, the output of which goes to the demodulator. If a tunable gun oscillator is used the tuner may be dispensed with. A low noise wide band preamplifier may be required to follow the microwave mixer.

Experiments are at present being carried out on the equipment side, and it is hoped to give practical details of both transmission and reception of ATV on the 3cms band in future issues.

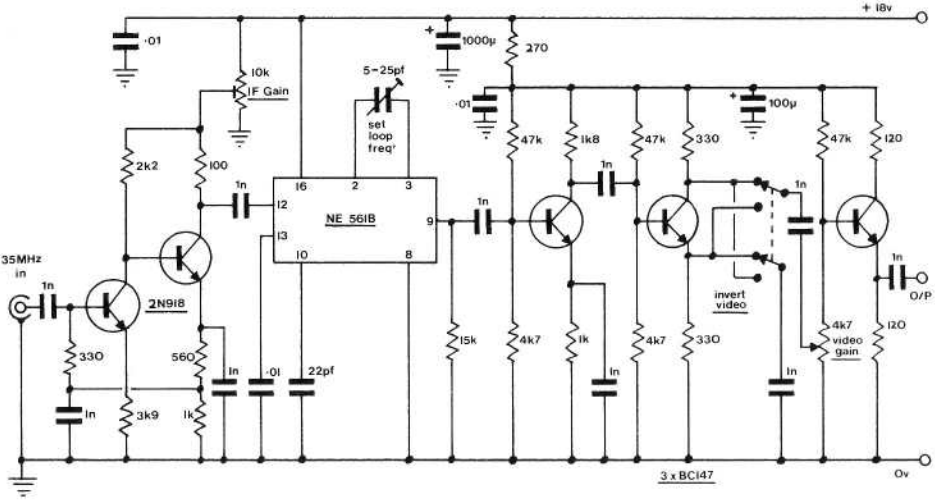


FIG 1. FM VIDEO DEMODULATOR.

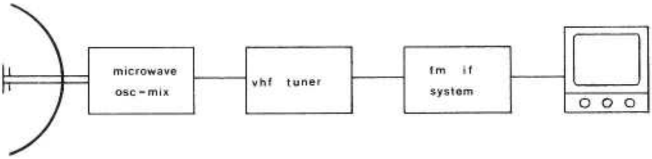


FIG 2.

REFERENCES

1. Long Distance Television   Western Publishing, 33 Cherville Street, Romsey, Hants. SO5 8FB
2. C Q - T V 103

A GUIDE TO
AMATEUR TELEVISION

Chapters on RECEIVING, TRANSMITTING, MONITORS, PICTURE SOURCES, COLOUR, RECORDING, SLOW SCAN TV together with details of Licences, history of B.A.T.C. and a list of other recommended books.

PRACTICAL HELP FROM PRACTICAL AUTHORS.

WRITTEN COMPLETELY BY B.A.T.C. MEMBERS.

Send your order to:
B.A.T.C. Publications
64 Showell Lane
Penn
Wolverhampton
Staffordshire.

NOW IN ITS SECOND EDITION

PRICE £1.50 post paid
(£2.00 to non-members)

Photo-etching of Printed Circuit Boards.

By Trevor Brown

This is a relatively easy process for the home constructor, and has been slowly getting easier over the last few years. Until now the main stumbling block has been preparing the photographic negative, but now one can get art work transferred onto a clear gel, to make a positive transparency suitable for a contact print, courtesy of Rank Xerox. They appear to do this while you wait at most branches, up to a size of A4 at a cost of 54p per copy. The process is designed to make transparencies suitable for use with overhead projectors, but they work well for printed circuit boards also.

The next part of the process is to make your copper pc board light-sensitive. This can be done in two ways; either by spraying it with a suitable aerosol or by buying it that way in the first place. R.S. Components market light-sensitive pc boards at a cost of £1.88 for a size of 203 x 114 mm. If, like me, you prefer to coat your own pc board, Kontakt Chemie make a photo resist in aerosol form, available from Electro Value Manchester. Before use, first clean the board with a good detergent such as Vim or Ajax as the surface must be completely grease-free and dry. Apply the spray at a distance of about 9 inches (this can be done under normal light conditions). The resist takes about 2-3 hours to dry at a normal room temperature and should best be carried out in the dark e.g. in a cupboard, but this can be speeded up to about 20 mins with the aid of a hair dryer, and subdued light is usually then sufficient.

Next comes expose and develop. The board is now sensitive to ultra violet light. I used an R.S. Components ultra violet light box which I am afraid will set you back £36, but one could easily be home-constructed It consists of two 12 inch 8 watt ultra violet fluorescent tubes in a wooden box about 15" x 8" x 3" with one of the sides of the box made out of thin glass 12" x 8" in size.

Suitable tubes are available from Service Trading Company, 57 Brigman Road, Chiswick at a cost of £2.97 each and £4.21 for their associated ballast units. Place the art work in contact with the sensitized side of the board, making sure to get the correct side in contact with the board. Exposure time is about 3-6 mins. and is carried out by placing the sandwich of art work and pc board face down on the light box.

Now we come to developing the printed board. Dissolve just less than one level teaspoonful of caustic soda in one pint of water and immerse the board in this completely and just wait until the image appears. This should take about 30 seconds. If it clears the board completely, the solution is too strong; if it does not clear properly, then it is too weak. A good "rule of thumb" is to be on the weak side as extra caustic can be added until the board is developed correctly. Now wash the board carefully under running cold water. The image of the art work should be clearly visible at this stage and will harden in contact with the air after a few minutes. Any imperfections should be touched up at this stage using an etch resistant pen. (Also available from R.S. Components).

The final process is to etch the board in ferric chloride solution. Constant agitation is required, or better still, bubble air through the solution using an aquarium type pump. When the board has been etched so that all the unwanted copper has been removed, clean the remaining resist off the protected copper. with Vim or Ajax, dry and apply a coat of flux to keep the board clean.

Drilling can now be carried out using a bit no bigger than 1mm.

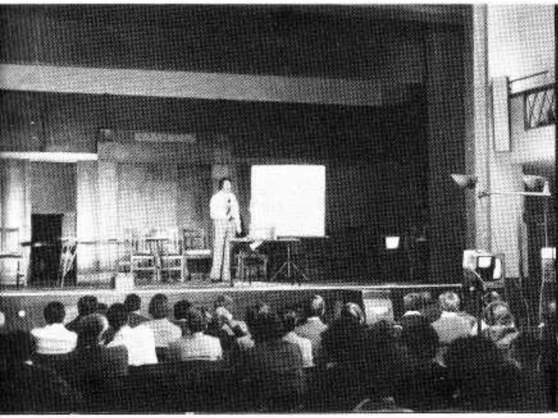
One last point. The art work is usually printed reversed i.e. it is shown as if you were looking through the board from the component side. This is so that when you get the gel made it requires placing with the ink side of the gel in contact with the pc board to give you sharper print.

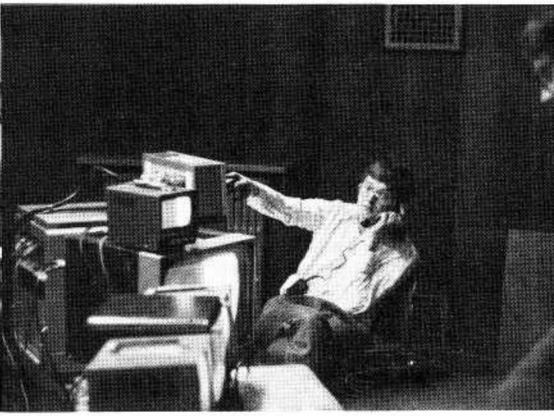
It is worth pointing out that ultra violet light can cause headaches in some people, so take care not to stare into the light source for prolonged periods.

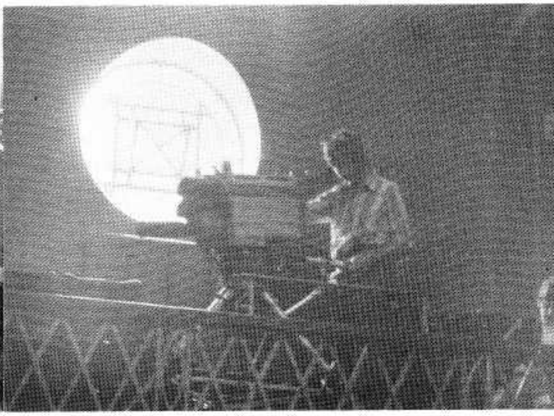
The whole of the above process can be carried out under normal artificial light i.e. no darkroom is required.

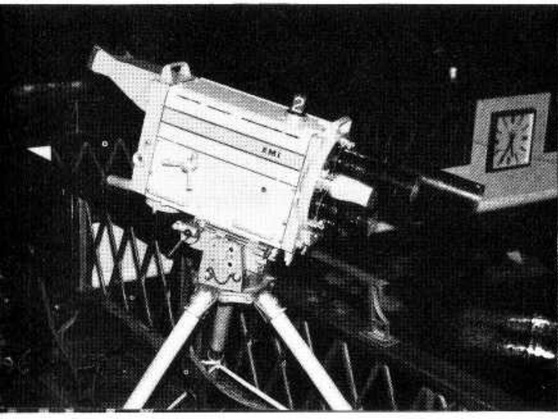
Convention 78 in pictures

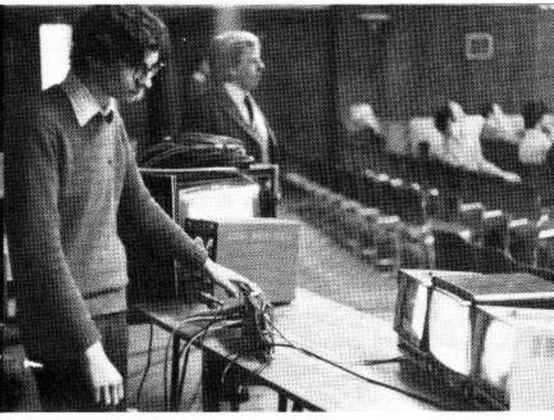
by
David
Wilson











B.A.T.C. Publications

This is a separate department of the Club. Do not send orders for publications to Club Sales, send orders to B.A.T.C. Publications
64 Showell Lane,
Penn, Wolverhampton,
West Midlands.

Slow Scan Television by B.J. Arnold G3RHI published by B.A.T.C. 2nd. edition 35p +8p p&p
A Guide to Amateur Television published by B.A.T.C. price (post paid) £1.50 to members and £2.00 to non-members. Overseas postage rates on request.

C Q - T V BACK ISSUES. The following issues are at present in stock: Nos. 68, 69, 73, 76, 77, 79, 82, 83, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95 onwards. The stocks of some are very low ans will soon run out. They are: Nos. 73, 76, 79, 83 and 86. Back issues cost 50p each for Nos. 93 onwards and 25p prior to 93. Return postage allowance would be appreciated. Any article which has appeared in the journal can be supplied in photo-copy from 5p per sheet. Payment for this service should be in postage stamps. A list of all the main articles which have appeared in C Q - T V giving details of how many sheets are needed to reproduce it is available for 40p (preferably in UK postage stamps) plus a large (9" x 4") s.a.e.

PLEASE NOTE THIS LIST CANCELS ALL OTHERS

Adverts

FOR SALE
Rank off-air tuner, VHF/UHF, 405/625. Standard video and audio outputs plus internal loudspeaker. 19" rack mounting. Working order £10.00

Fern high-precision vidicon camera head with lens and slide scanning attachment. I have no data available but the addition of simple power supplies should make an extremely high quality camera. £30.00 ono.

Miscellaneous panels with illuminated push-button switches. Please enquire
Jeffrey Borin
50 Bonnersfield Lane,
Harrow, Middx.
Tel. 01-863 2880 weekends only.

HELP
I own a small 2/3 inch vidicon camera with optical viewfinder. I have now been waiting for over a year for the dealer in question to provide a manual which was supposed to be part of the deal. Can anyone help with information.
The unit is sold as a Eumig VC551 but has also been advertised as a Grundig FA1005 - a 525 line version has also been advertised recently in Ham Radio under yet another alias.
T.W. Mitchell
30 Old Farm Close,
Hounslow, Middx.
TW4 7AB.
Tel. 01-572 1510

WANTED
Photocopy, or loan to photocopy, of technical manual or circuit for Aztec Instruments Ltd camera and Bealah transistor 405 line camera.
Ian Douglas GM4FGS
4 Dampanic
Dunlop KA3 4BZ
Tel: Dunlop 483

FOR SALE
2 off 1" vidicon yokes, transistor type £3.each
+66p post.
Used 1" vidicons, suit initial trying out of camera
£1-2 each
+36p post

Trevor Lumb
14 Linton Gardens
Bury St Edmunds
Suffolk
Tel: 0284 4318

B.A.T.C. SALES

CAMERA TUBES

	Price	Post & Packing
EEV Leddicon	£82	nil
½" E.M.I. 97777 Ebitron	£28	nil
⅔" E.M.I. 9831 amateur grade vidicon	£11	nil
1" E.M.I. 9677 amateur grade vidicon	£11	nil
1" E.M.I. 9728 amateur grade vidicon	£11	nil
1" English Electric P849 amateur grade vidicon	£12	nil
4½" E.M.I. 9565 Image Orthicon	£10 for two, buyer collects.	

COILS

1" B.A.T.C.	£11.54	54p
1" ex-industrial (limited number only)	£ 6	54p
⅔" E.M.I.	£11.50	54p

ACCESSORIES

Paxolin sockets for 1" or " vidicons	.32	8p
C mount for lens	£ 2.50	10p

STATIONARY

B.A.T.C. headed notepaper and envelopes	£ 1.75	
Lapel badges	40	8p
Adhesive badges (for equipment)	15	8p
Windscreen stickers	6	8p
Reporting charts	12	8p
EEV Camera charts	£ 1.65	30p
B.A.T.C. Test Card	50	10p

PRINTED CIRCUIT BOARDS

C Q - T V SPG printed circuit board ready drilled	£ 3	10p
C Q - T V SPG Genlock Unit printed circuit board ready drilled	£ 3	10p
Project 100 printed circuit boards ready drilled, each	£ 4	10p

Rapidly increasing postal charges have compelled us to quote the above post and packing charges. Will overseas members please ask for a quotation before sending cash. Obviously, for small items such as badges & stickers etc, one can send several items for the same postal charge - please try and estimate the correct amount. Our thanks go to those members who estimate on the high side and suggest that any balance be put to Club funds.

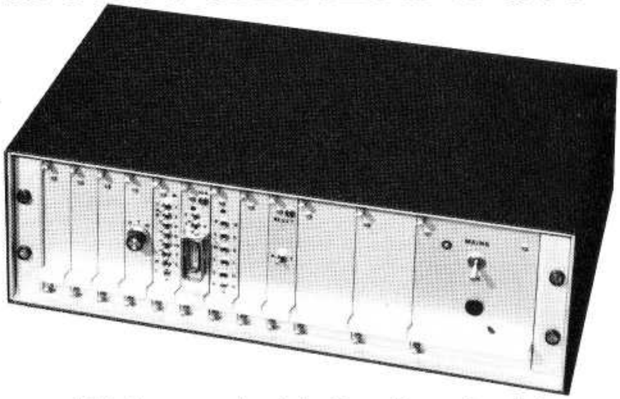
Please send your order to C. G. Dixon (B.A.T.C. Club Sales)
Kyrles Cross
Peterstow
Ross-on-Wye
Herefordshire.

Project 100 printed boards are available from Tom Mitchell at 30 Old Farm Close, Hounslow, Middlesex, at the prices quoted above. Suitable Xtals are also stocked by him at £2.60 each. (4fsc and 5 MHz)

PLEASE NOTE THIS LIST CANCELS ALL PREVIOUS ONES.

Printed by Photoset Litho Ltd., Depot Road, Epsom, Surrey

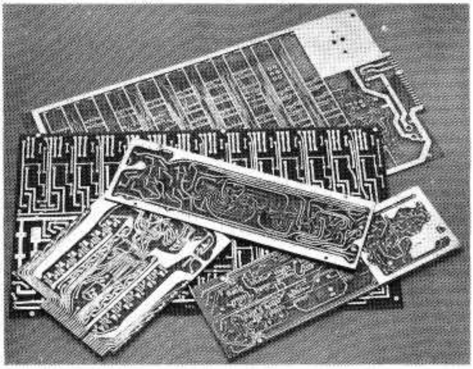
T.V. CHARACTER GENERATOR



The Crofton character generator has been designed to produce upper case alpha, numerics and sundry symbols. The standard keyboard having 60 keys. The equipment will lock to a standard mixed sync source and provide a composite output of 1.4v p-p into 75 ohms.

The standard format provides 3 pages of 16 characters by eight lines. Page select is by simple rotary switch.

This inexpensive instrument will find many applications within the video field for both the professional and semi professional user. Price on application.



The Crofton PCB Service

The Crofton P.C.B. service has been set up to offer a service to both the small and medium sized electronics company.

Being fully aware of the pressures on most engineers today, we have set up a specialist operation capable of producing P.C.B. designs and boards from the most scanty information.

You give us the circuit and we will do the rest. Whether you want high quality or low price commercial boards we can offer you a competitive service. Prototypes can normally be provided within 2–3 days from receipt of artwork.

So next time you're in the market for this type of service just give us a ring.

CROFTON
ELECTRONICS LTD

35 Grosvenor Road, Twickenham, Middlesex. Telephone: 01-891 1923